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PREFACE

This report is the second in a series of reports on research in the marketing of eggs. The first, *Assembly and Distribution of Eggs in Honolulu*, was published as Agricultural Economics Bulletin 2. Subsequent reports will concern costs and margins in the marketing of eggs and consumer reactions to price changes of eggs.

The authors gratefully acknowledge the advice and guidance of D. B. DeLoach, Ralph Elliott, and Perry F. Philipp in the conduct of the study and preparation of the manuscript. They greatly appreciate the assistance of Stephen Doue in statistical calculations; of Asaiah Shon in machine tabulation; and of Ethel Nihei in editing the text and tables. Colleagues in the Department reviewed the original manuscript and suggested many improvements—thanks and mahalo to them.

Special acknowledgment is due the 1,050 homemakers in Honolulu whose answers to questions made possible the information presented in this report. The interpretations of these answers are the responsibility of the authors.

HIGHLIGHTS OF FINDINGS

THE CONSUMING UNIT

Half of the families for which completed questionnaires were obtained were of Oriental extraction, one-tenth of Hawaiian ancestry, and one-fifth each of the Caucasian and "other" group (all other racial ancestries not specifically mentioned). The average size of all families was 4.7 persons; the Caucasian families had 3.5 persons and each of the remaining racial groups had 5 persons per family. Family income was highest for the Caucasian respondents, at an average of almost $4,500 annually. The income of Oriental families, at $3,900, was above the average of the sample. Distribution by age groups showed almost half of the total number of persons in the sample in the 19- to 50-year group and one-fourth in the 6- to 18-year group. Customs and habits of consumption of the persons under 50 years of age are likely to influence preference and demand for a number of years.

PURCHASES OF EGGS

To Oriental homemakers the chief criterion in purchasing eggs was island[1] source; Caucasians stressed grade and size while Hawaiians and "others" indicated price as the most effective single guide. A greater proportion of families with higher incomes purchased island eggs. Quality of eggs was important to Honolulu homemakers since local source was associated with freshness and high quality. Homemakers with low incomes gave added consideration to price while those with high incomes placed more emphasis on size, grade, and local source.

USES OF EGGS

Eggs were used by 98 of 100 homemakers in the 2 weeks just prior to the interview. Per capita consumption for all persons in the sample was six eggs per week. The "breakfast egg" accounted for almost two-thirds of the weekly per capita consumption.

By racial groups the per capita consumption was greatest for Caucasians and lowest for Hawaiians. Consumption by Oriental families was above the average of the entire sample; the percentage of families using island eggs was largest for this group. Family income status did not appear to affect per capita consumption since the high and low income families showed approximately the same weekly consumption per person. The per capita consumption of eggs decreased from 8.5 to 4.5 eggs per week as the family increased from one and two persons to seven persons or more.

PRICES OF EGGS

In relation to prevailing prices of other foods, 4 in 10 homemakers gave $1.00 per dozen as the maximum price they would pay for Grade A, large

[1] The term "island" refers to eggs produced in the Territory in contrast to the mainland or the continental United States.

island eggs, and only 3 in 10 would pay more than $1.00. More than a third of the Oriental families and the high income families would pay above $1.00 per dozen.

More than half of all homemakers would buy more eggs if the price were lower, and 6 in 10 homemakers in the low income families would buy more. Lower prices were a greater incentive to additional purchases in the larger families of five or more persons.

Homemakers were generally willing to pay 10 to 15 cents per dozen premium for island eggs over mainland eggs of the same size and grade. The indicated premium for island eggs varied somewhat at different prices since most homemakers were reluctant to approve a price above $1.00 per dozen. The differential in price between sizes of eggs of comparable quality was listed at 15 cents per dozen by most respondents.

PREFERENCE AND QUALITY

Half of all homemakers had no preference for color of eggs, but of those who expressed a choice the preference was for brown eggs. This preference was associated with source of eggs, since most island eggs have brown shells.

Island eggs were stored in the home under refrigeration by only 6 in 10 homemakers while 9 in 10 kept mainland eggs in refrigerators. More frequent purchases and greater per capita consumption of island eggs influenced the method of storing in the home.

Only 3 in 10 respondents indicated that any unsatisfactory eggs had been purchased in the past 5 years. Of this number almost half had bought unsatisfactory mainland eggs at some time but only one-fourth had found fault with Oahu eggs. The chief defect of mainland eggs was strong odor and of Oahu eggs was blood spot. Consumers had little criticism of eggs from the outlying islands.

INTRODUCTION

The supply of eggs for civilian consumption in Honolulu originated from three sources. During 1950 commercial poultrymen on the island of Oahu produced 47 percent of the volume of eggs entering the market; 14 percent were imported from Hawaii, Maui, and Kauai; and the remaining 39 percent were imported from the Mainland. During July and August fewer eggs were imported from the Mainland and from the outer islands.

The civilian population of Honolulu numbered approximately 232,200[2] on July 1, 1950, according to estimates based on the census of population. The population was made up of many races: Japanese made up about two-fifths, Chinese and Koreans one-tenth, and Caucasians more than one-fifth. Hawaiians, part-Hawaiians, and Filipinos made up the bulk of the remaining number.

The survey upon which this report is based was made to provide information on consumer opinions, preferences, and purchases of eggs. Information was needed to determine the relative importance of the factors that affect the consumption of eggs, particularly the reasons that influenced the purchase of eggs, the uses made of eggs from various geographic sources,

[2] Source: Department of Health, Territory of Hawaii, Bureau of Health Statistics.

and the opportunity for increased consumption of eggs. The design of the questionnaire, method of obtaining the sample, and procedure of the interview are described in appendix B, page 31.

FINDINGS OF THE SURVEY

The results of the survey of consumers' opinions, preferences, and actions are summarized in tables in appendix A. The interpretation of these results is discussed in the text in relation to purchases, uses, prices, and quality of eggs as well as by consumers' preferences and opinions on eggs. These are analyzed on the basis of differences by race, family income, and size of family.

Sample households were classified into four racial groups for reporting the results of the tabulations. The distribution of families was in the ratio of five Oriental, two Caucasian, one Hawaiian, and two of other racial groups.

Results of tabulations are presented in the appendix tables by three classifications of family income. Almost 15 percent of the families had less than $2,000 annual income; about 60 percent were in the $2,000 to $5,000 group, and 25 percent had over $5,000.

Replies to questions were tabulated by four sizes of families. One-third of the sample households contained one to three persons; one-fifth had four persons per family; more than one-fourth contained five or six persons; almost one-fifth had seven or more persons.

THE CONSUMING UNIT

The average number of persons per family was 4.7 for all households in the sample population. This compares with 4.4 persons per family on the island of Oahu (Honolulu County) in the Census of 1950. Caucasian families were smallest, with 3.5 persons, while the other racial groups averaged 5 persons per family (table 1). More than half of the non-Caucasian households contained five or more persons (table 1, appendix A). In Oriental households, 7 in 10 persons were in families of this size. For all sample households almost two-thirds of the consumers were members of families of five or more persons (table 2, appendix A).

TABLE 1.—Number, size, and income of families in survey, by racial groups.

ITEM	ORIENTAL	HAWAIIAN	CAUCASIAN	OTHER	ALL
Number of families	519	111	209	211	1050
Percentage of families	49	11	20	20	100
Average family income*	$3,895	$2,896	$4,488	$2,960	$3,720
Persons per family	5	5	3.5	5	4.7
Per capita income*	$772	$578	$1,296	$594	$789

*Annual.

Replies to questions on purchase and use of eggs were analyzed by three groups of family incomes to determine any differences in opinions, preferences, or behavior. Only 15 percent of the sample households were in

the group with less than $2,000 annual income, and about one-fourth had incomes of $5,000 or higher (table 3, appendix A). The average annual family income was $3,720 for the sample households in Honolulu in comparison with $3,757 per family on Oahu in the Census of 1950. Family income was highest for the Caucasian group and lowest for the Hawaiian. Many of the families with higher incomes were Caucasian but families were smaller, and there were fewer persons to eat eggs.

Annual per capita income showed a wide range by racial groups (table 1), with Caucasians more than 60 percent above the group average and Hawaiians 25 percent below. A higher proportion of wage earners, as well as fewer persons per family, were contributing reasons for the high per capita income of Caucasians. The Oriental population, comprising more than half of the consumers in the study, had per capita incomes near the average.

The number of persons in the family was greater in the medium and high income groups than in the low income group (table 2). Nevertheless, per capita income increased from group to group. Income per person was 78 percent greater in the medium income group and 196 percent greater in the high income group when compared to the low income group.

TABLE 2.—Household characteristics by annual family income.

ITEM	ANNUAL FAMILY INCOME GROUP			
	Less than $2,000	$2,000 to $4,999	$5,000 and over	All families
Number of families	150	643	257	1050
Number of persons	573	3,052	1,326	4,951
Persons per family	3.8	4.7	5.1	4.7
Per capita income	$393	$700	$1,163	$789

Distribution of the sample population by age groups showed almost half of the total to be in the 19- to 50-year group and one-fourth in the 6- to 18-year group. Only 1 in 10 persons of the sample population was over 50 years old (table 4, appendix A). The age distribution was approximately the same for the most numerous racial group—the Oriental—as for the entire survey population. The Caucasian group had a greater proportion in the advanced age class than had any other racial group. Opinions, preferences, and behavior indicated by the majority of this sample population are likely to be influential for a number of years.

One-third of the families in the sample population depended upon a service occupation[3] for livelihood, almost one-fifth upon a profession, and about one-fourth upon a business or employment in a commercial enterprise (table 5, appendix A). In the high income group, 7 families in 10 were in the professional or business group while in contrast 6 in 10 low income families depended upon pensions, unemployment allowances, and miscellaneous low-paid occupations for their income.

The relationship between education and family income (table 6, appendix A) showed a tendency toward higher family incomes with additional

[3] Skilled and unskilled occupations ranging from specialized trades, such as electrical engineer, to laborer, such as gardener.

education. The relationship is fairly direct between percentage of professional occupations and college education in each income class.

PURCHASES OF EGGS

A sharp distinction is made in the Honolulu market between eggs from various sources. The word "Oahu" is used in brand designations on cartons which contain eggs produced on that island. Eggs from Hawaii, Maui, and Kauai are sold in cartons that bear distinctive brand names which are easily recognized by consumers. Shell eggs which are imported from the Mainland are treated before shipment with light mineral oil as a measure of preservation. Individual eggs are stamped as to country of origin, and cartons are labeled "shell protected." Brands and the lower retail prices make it easy to distinguish mainland eggs from outer island or Oahu eggs. Most mainland eggs have white shells in contrast to the brown shells of most eggs produced in the Territory.

One hypothesis used in developing this study was that homemakers used island and mainland eggs for different purposes and probably employed different criteria in purchasing eggs from the two sources. Price and source of eggs appeared to be closely interrelated in the reasons given by homemakers for purchasing eggs. Homemakers associated higher quality and grade with Oahu and outer island eggs.

Various combinations of reasons were given for purchase of eggs for frying, boiling, and other individual methods of cooking in 8 of 10 interviews (table 9, appendix A). Combinations of reasons included price, grade, size, and origin in various sequences, with price in each combination. Similar reasons were given for purchase of eggs for cooking with other foods. Analysis of replies indicated no differences in the reasons for buying eggs for different methods of preparation.

Racial groups and purchase of eggs. Eggs were bought at grocery stores by 7 in 10 of the respondents, but one-fourth of all families obtained eggs from farmers on egg routes or at the farm. A higher proportion of Orientals bought directly from producers while a higher proportion of Caucasians bought from stores (table 7, appendix A).

Oahu eggs were purchased exclusively by half of the families (table 3). A higher percentage of Oriental homemakers bought Oahu eggs than did any other racial group. Orientals stressed source of eggs in purchase while Caucasians stressed grade and size. Price was the most important criterion for Hawaiians and "others."

TABLE 3.—Purchases of eggs by racial groups.

SOURCE OF EGGS	ORIENTAL	HAWAIIAN	CAUCASIAN	OTHER	ALL
			Percent		
Oahu	56	41	53	44	52
Outer islands	19	19	8	11	15
Mainland	4	8	10	11	7
Combined sources*	21	32	29	34	26
Total	100	100	100	100	100

*See table 8, appendix A.

Family income and purchase of eggs. The relationship between family income status and purchase of eggs was more pronounced than that between racial groups and purchases. In the low income group (less than $2,000 annually) 1 in 4 homemakers gave price alone as the criterion, and less than 3 in 10 gave major consideration to reasons other than price. In the medium income group 1 in 10 considered price most important, compared to only 1 in 20 in the high income group ($5,000 or more annually) (table 10, appendix A). Size, grade, and Oahu source were considerably more important to respondents with high incomes than was price per dozen. The combination of price with other reasons for purchase accounted for almost half the replies in all income groups.

In the high income group 6 in 10 respondents bought Oahu eggs only, and 8 in 10 bought island or Oahu eggs. There was some indication that more mainland eggs were bought by families with lower incomes (table 4). However, 7 in 10 homemakers in the low income group bought island or Oahu eggs.

TABLE 4.—Purchases of eggs by family income and source of supply.

SOURCE OF EGGS	FAMILY INCOME GROUP			
	Less than $2,000	$2,000 to $4,999	$5,000 and over	All families
	Per cent			
Oahu	47	48	63	52
Outer islands	21	16	11	15
Mainland	11	7	4	7
Mainland and island	21	29	22	26
Total	100	100	100	100

Size of family and purchases. Preference for source of eggs did not vary appreciably by size of family unit (table 11, appendix A). Tabulation by four sizes of families showed comparable purchases of Oahu eggs, although more mainland eggs and fewer outer island eggs were purchased by the larger families.

USES OF EGGS

Eggs were used by 98 in 100 families in the 2 weeks just prior to the interview and had been used by all families at some time. Island eggs were used by 88 in 100 families while only 22 in 100 reported the use of mainland eggs. The quantity of island and mainland eggs used per family in the week prior to the interview was determined. Consumption was determined by racial groups, family income, and size of family.

Eggs eaten at breakfast accounted for almost two-thirds of the per capita consumption during the week prior to the interview. Eggs were used for breakfast by 94 in 100 families. The greatest number of homemakers used 1 dozen eggs per week for breakfast; a considerable number used 2 dozens per week (table 22, appendix A). Per capita consumption in this form as well as in other methods of serving eggs declined as size of family increased

(table 21, appendix A). Smaller families usually contained a higher proportion of adults of working age.

Use of eggs for cooking, in sandwiches, and other combination methods of serving was relatively unimportant. For main dishes, desserts, and other uses the prevailing rate of use was ½ dozen per week.

Only one in four homemakers considered that she used island and mainland eggs for different purposes. Very few used island eggs exclusively for the table, more homemakers used them for combined table and cooking purposes. In contrast, the mainland eggs were used almost exclusively for cooking.

Racial groups and use of eggs. The proportion of families that used island eggs ranged from 95 percent for Oriental to 78 percent for "other" (table 5). The range for use of mainland eggs was from 28 percent of Caucasian families to 17 percent of Oriental (table 13, appendix A). Hawaiian families used fewer island eggs and more mainland eggs than the average for all families.

TABLE 5.—Use of island eggs per week, by racial groups.

NUMBER OF EGGS	ORIENTAL	HAWAIIAN	CAUCASIAN	OTHER	ALL
			Percent		
None	5	18	14	22	12
12 to 23 eggs	28	30	35	28	29
24 to 35 eggs	31	25	23	23	27
Other quantities*	36	27	28	27	32
Total	100	100	100	100	100

*See table 12, appendix A.

More than half of all families used from 1 to 2.5 dozen island eggs per week and one-fourth used 3 dozens or more. An even higher proportion of the larger Oriental families used more than 2 dozens per week. Most of the smaller Caucasian families used 1 to 2 dozens per week. Mainland eggs were used by 1 in 10 families in all racial groups at the rate of 1 to 1.5 dozens per week.

Family income and use of eggs. In the low family income group, 15 families in 100 used no island eggs at the established retail price of 90 cents per dozen for Grade A large; only 5 in 100 families in the high income group did not use eggs from local sources in the week prior to the interview. Half of the low income families bought less than 2 dozen island eggs per week. In contrast, two-thirds of the high income families purchased 2 dozens or more (table 6). The quantity used per family increased in proportion to the additional family income, from 2 dozens to more than 2.5 dozens per week. The use of mainland eggs did not indicate significant differences or any trend in quantity between income groups. More families in the medium income group used mainland eggs than any other income group (table 16, appendix A).

FIG. 1. PER CAPITA CONSUMPTION OF ISLAND AND MAINLAND EGGS IN WEEK PRIOR TO INTERVIEW.

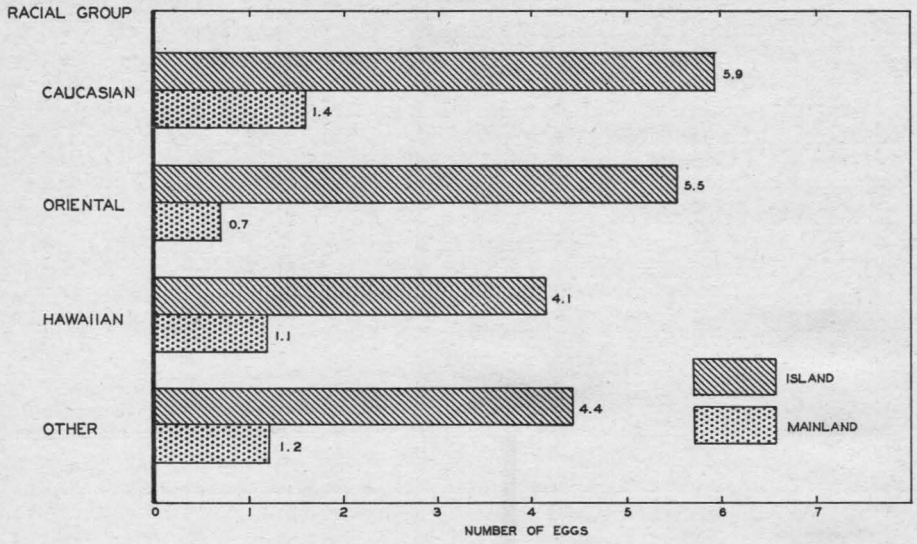


FIG. 2. PER CAPITA CONSUMPTION OF ISLAND AND MAINLAND EGGS, BY SIZE OF FAMILY IN WEEK PRIOR TO INTERVIEW.

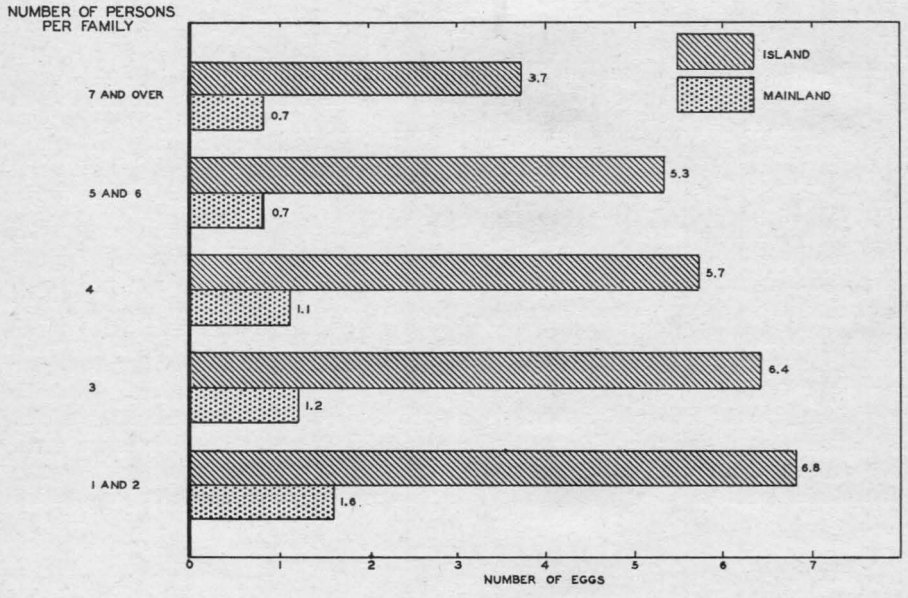


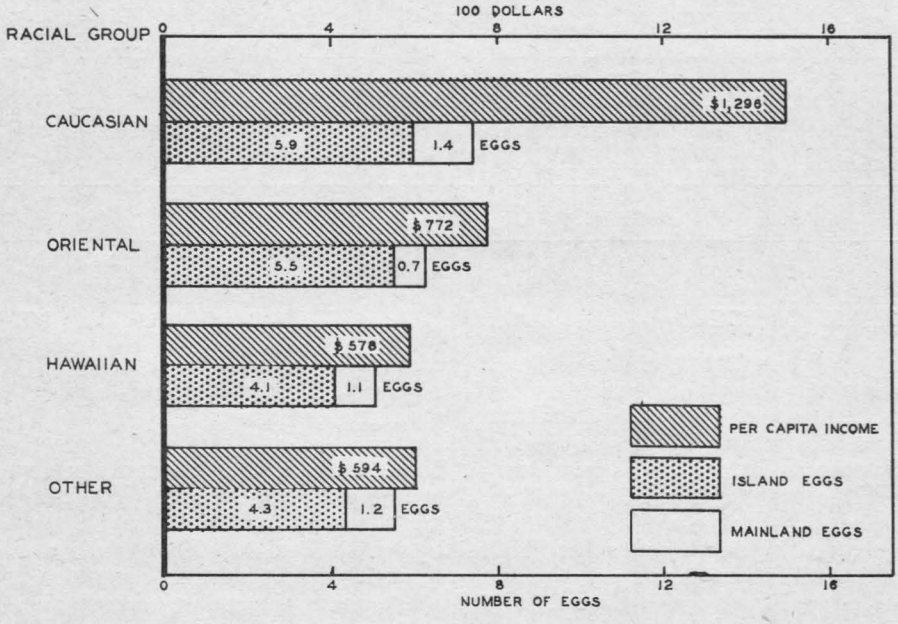
TABLE 6.—Use of island eggs per week, by income groups.

NUMBER OF EGGS	LESS THAN $2,000	$2,000 TO $4,999	$5,000 AND OVER	ALL
		Per cent		
None	15	14	5	12
1 to 11 eggs	12	6	5	6
12 to 35 eggs	60	58	50	56
36 eggs or more*	13	22	40	26
Total	100	100	100	100

*See table 15, appendix A.

Per capita consumption of eggs. The per capita consumption of eggs was calculated on the basis of race (table 14, appendix A), by income (table 17, appendix A), and size of family (table 20, appendix A).[4] The rate for the

FIG. 3. WEEKLY PER CAPITA CONSUMPTION OF EGGS IN RELATION TO ANNUAL PER CAPITA INCOME OF RACIAL GROUPS.



[4] Data in the consumer survey are on the basis of 1 week and apply only to families in the city of Honolulu. Annual egg consumption in the city and county of Honolulu during 1950 was calculated at 203 eggs per capita (for resident civilians). Calculation was based on census and Extension Service data of Oahu eggs produced and sold and imports from the mainland, foreign countries, and outlying islands.

week prior to the interview was highest for Caucasians at 7.3 island and mainland eggs per person; Orientals, 6.2; "other" races, 5.5; and Hawaiians, 5.2 (fig. 3). However, the per capita income also varied by racial groups, and this factor may have as much bearing on per capita consumption as racial dietary habits.

The weekly per capita consumption of eggs showed a downward trend as size of family increased. This was true for both island and mainland eggs. Consumption was greater than one egg per day per person for the one- to three-person families, but was about one-half egg per day for the largest families.

Size of family and use of eggs. Since 9 in 10 families used island eggs, each size group contained enough families to provide a pattern of quantity used per family. Consumption of island eggs did not increase in proportion to the increase in size of family, but the tendency was toward use of larger quantities by the larger families (table 7). The modal quantity of mainland eggs used was 1 to 2 dozens per week as reported for all sizes of families (table 19, appendix A). There was little tendency toward greater use of mainland eggs by the larger families.

TABLE 7.—Use of island eggs per week, by size of family.

NUMBER OF EGGS	1 TO 3 PERSONS	4 PERSONS	5 TO 6 PERSONS	7 OR MORE PERSONS
		Per cent		
None	15	13	5	15
12 to 23 eggs	42	29	23	15
36 to 47 eggs	5	12	24	18
Other quantities*	38	46	48	52
Total	100	100	100	100

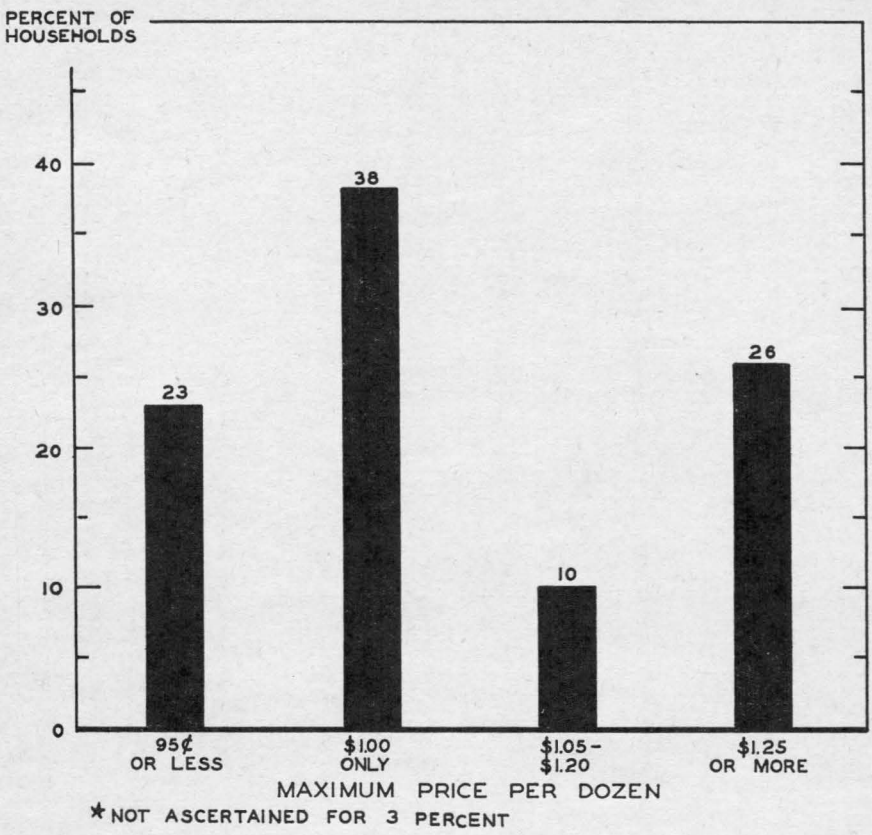
*See table 18, appendix A.

PRICES OF EGGS

Prices which homemakers paid for island eggs varied by a range of 20 cents per dozen during the period of the survey. Seasonal decline in production of eggs, together with uniform demand by consumers, resulted in four increases in retail prices in the 2 months. Large, Grade A island eggs were bought at 75 to 95 cents per dozen while the medium size sold at a discount of 10 cents per dozen from these prices (table 23, appendix A). The range for mainland eggs was from 62 to 75 cents per dozen for large, Grade A eggs during this period. The spread in retail price for comparable size and grade of island and mainland eggs increased from 13 to 20 cents per dozen as the supply of island eggs declined. In 1951 island and mainland eggs were selling at prices about 15 cents higher per dozen than for the same period in 1950.

Racial groups and price of eggs. Four in 10 homemakers reported that $1.00 per dozen was the maximum price they would pay for large, Grade A island eggs. Only 3 in 10 Hawaiian families would pay this price (table 24, appendix A). Previous experience with high prices for island eggs in 1949 led some respondents to quote a price greater than $1.00 per dozen. More than

FIG. 4. PERCENTAGE DISTRIBUTION OF HOUSEHOLDS, BY MAXIMUM PRICE THAT WOULD BE PAID FOR ISLAND EGGS.*



a third of all homemakers indicated that they would pay more than $1.00, but that $1.45 per dozen was the limit for most of them. Slightly more Oriental homemakers thought that they would pay higher prices.

Family income and price of eggs. A slightly larger proportion of homemakers in the high income group, and fewer than average in the low income group, would pay more than $1.00 per dozen (table 25, appendix A). Differences between the extreme income groups were not as great as might be expected since 8 in 10 homemakers with high incomes would pay $1.00 or more per dozen while 7 in 10 with low incomes would buy eggs at this range of prices. Other factors of demand probably influenced the opinions of homemakers in replies to the question regarding price.

Family income and use of more eggs. In the 12 months prior to the survey, consumers had experienced a range in retail prices from $1.35 to 75 cents per dozen for large, Grade A island eggs.

Slightly more than half of all homemakers expressed the opinion that more eggs would be used if the price were lower. Sixty in 100 purchasers with low incomes would buy more eggs at a lower price in contrast to 45 in 100 with high incomes (table 26, appendix A). The majority of this number would buy 1 dozen more eggs (table 27, appendix A). Homemakers with high purchasing power would not buy as many additional dozens as those with lower incomes. Purchases and consumption were at a higher rate for these families, and few additional eggs could be used.

Only 13 in 100 homemakers indicated that more eggs would be used if family income were higher. The proportion was somewhat greater for the low income group than for the high income families. Of those who would buy more eggs, 1 dozen was the quantity of extra purchases for most families with a few willing to buy 2 dozens more.

Size of family and use of more eggs. Lower prices were a greater incentive for additional purchases of eggs to the larger families of seven or more persons, although more than half of all homemakers were willing to buy more eggs (table 8). More than a third of the homemakers for the largest families would buy 1 dozen more eggs per week at lower prices. In the small families only ½ to 1 dozen more would be purchased. A somewhat greater proportion of the medium-size families indicated that more eggs would be bought with higher incomes per family. Most of these would buy only 1 additional dozen per week.

TABLE 8.—Additional eggs that would be purchased per week at lower prices, by size of family.

NUMBER OF EGGS	1 TO 3 PERSONS	4 PERSONS	5 OR 6 PERSONS	7 OR MORE PERSONS	ALL
			Percent		
2 dozens more	7	9	11	16	12
1 dozen more	32	34	38	34	36
No more	48	45	42	41	42
Other*	13	12	9	9	10
Total	100	100	100	100	100

*See table 29, appendix A.

Price premium for island eggs. Eggs from Oahu and the outer islands of the Territory are sold in Honolulu retail stores at consistently higher prices than the shell-protected eggs imported from the Mainland. For eggs of comparable size and grade this spread has been as great as 40 cents per dozen in postwar years; in months of surplus production in the Territory, this differential has been as low as 5 cents per dozen. Homemakers were questioned in regard to the price which they would pay for large, Grade A island eggs if mainland eggs of the same size and grade were selling at: (a) 60 cents per dozen and (b) at 85 cents per dozen.

More than 6 in 10 homemakers in low income families would not pay more than 14 cents per dozen premium for island eggs. Although 3 in 10 would pay 15 to 25 cents when mainland eggs were 60 cents per dozen, few would pay this additional amount over the 85-cent base price (table 30, appendix A). Homemakers in high income families would pay a somewhat

greater premium per dozen over the base price of 60 cents but were reluctant to pay more than 15 cents premium over the 85-cent base price.

Many homemakers would not pay more than 15 cents per dozen differential between sizes of eggs of the same quality (table 31, appendix A). At 60 cents for small eggs, 9 in 10 would not pay more than 75 cents for medium eggs. More of the homemakers in high income families would pay 10 to 15 cents premium than would those in low income households. Practically the same proportion of homemakers would not pay more than 85 cents for large eggs when medium eggs were listed at 70 cents per dozen. The pricing method in general use in retail stores in Honolulu reflects a 10-cent differential between large and medium eggs. This is increased to 20 cents between small and medium eggs, especially in the fall season when a higher proportion of small eggs is produced.

CONSUMER PREFERENCE

Opinions of homemakers were obtained as to color of eggs preferred and the quality of eggs from various sources. Distinct differences between mainland and island eggs were apparent to consumers.

Color preference. Half of all homemakers had no preference for color of eggs but 47 in 100 expressed a preference for brown eggs. This preference is interrelated with source of eggs since most island eggs have brown shells while eggs imported from the Mainland are usually white. Only one-third of the Caucasians expressed a preference for brown eggs. Almost two-thirds of "other" racial groups preferred brown eggs (table 32, appendix A). Color of eggs was an incidental factor in choice since source of supply was the dominant measure.

By family income groups there were few significant differences in color preference. Four in 10 homemakers in low income families indicated a preference for brown eggs. A slightly higher proportion of the high income families preferred brown eggs.

Preference for home storage of eggs. Homemakers in Honolulu treat island and mainland eggs somewhat differently in regard to storage in the home. Six in 10 stored island eggs under refrigeration while more than 9 in 10 kept mainland eggs in refrigerators. This difference reflects the method of display in retail groceries, where mainland eggs are usually offered for sale in refrigerated display cases and island eggs are displayed quite often on top of the same case or on adjacent shelves.

Methods of storage in the home varied considerably according to major racial groups. Only half of the Oriental homemakers kept island eggs under refrigeration. With above-average size of family and per capita consumption, eggs were used in a short time after each purchase and refrigeration was considered unnecessary. Many housewives in this group bought eggs from farmers or from stores where the eggs had been kept at room temperature. Frequent purchases, rapid consumption, and inherent distrust of "cold storage" combined to develop this method of handling by half of the families interviewed. In contrast, 9 in 10 Caucasian homemakers kept eggs in the refrigerator. Although per capita consumption was high, the size of family was smaller and each purchase of eggs was used over a longer period. Habit and custom affected storage preferences of consumers. Many of the larger

retail groceries now display island eggs under refrigeration, especially in summer months, and consumers tend to follow this example of merchandising practice.

Reaction to quality of eggs. Approximately 3 in 10 homemakers indicated that in postwar years eggs had been purchased which were unsatisfactory in some way (table 33, appendix A). By racial groups the Caucasians were more critical (they also bought a greater proportion of mainland eggs), but only 4 in 10 expressed dissatisfaction with their purchases. In general, Oriental homemakers were more satisfied (and bought more island eggs) since only 2 in 10 indicated that inferior eggs had ever been purchased.

By source of supply, almost half of the homemakers who had used mainland eggs indicated that eggs of poor quality had been received at some time in the last 5 years (table 34, appendix A). The chief defect of these eggs was strong odor, which was associated with age and possibly with non-refrigerated display in stores and storage in the home. Approximately one in four homemakers who had used Oahu eggs reported that a defective egg had been received at some time. Blood or meat spots were the chief defects of these eggs. This defect could be readily eliminated by more careful candling in the grading process.

Eggs from the outer islands showed fewer defects, and less dissatisfaction was expressed with them probably because most of these eggs are recandled in cooperative or commercial establishments. More dissatisfaction was indicated by consumers in the instances where island poultrymen performed the marketing function of grading and packing in consumer cartons.

CONCLUSION

The quantity of eggs used per person varied according to racial groups but to a lesser degree than has been commonly supposed. Per capita income also varied by race, and the income factor may have as much influence on egg consumption as racial dietary customs.

Price had a significant effect on the choice between island eggs and mainland eggs. Homemakers expressed their preference in the ratio of eight island to two mainland eggs, but actual purchases in the survey period were six island to four mainland eggs. This indicates that narrowing the price differential between mainland and island eggs, at least during the second half of the year, would increase the amount of island eggs sold.

Such a change in the seasonal volume of island egg supply would require an increase in production from June through December. Whether this would prove profitable to poultrymen can be definitely determined only by trial, but experimental production data indicate that summer and fall production can be economically increased.

APPENDIX A

TABLE 1.—Distribution of families by size for four racial groups.

SIZE OF FAMILY	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
1 and 2 persons	9	22	30	13	15
3 persons	16	16	26	16	18
4 persons	21	15	22	17	20
5 and 6 persons	32	23	19	31	28
7 persons and over	22	24	3	23	19
Total	100	100	100	100	100
Percent of families	49	11	20	20	100
Persons per family	5.0	5.0	3.5	5.0	4.7

TABLE 2.—Distribution of total number of persons in families, by size of family for four racial groups.

SIZE OF FAMILY	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
1 and 2 persons	3	7	16	4	6
3 persons	10	10	23	10	12
4 persons	16	12	25	14	17
5 and 6 persons	35	26	29	33	32
7 persons and over	36	45	7	39	33
Total	100	100	100	100	100

TABLE 3.—Distribution of families by family income for four racial groups.

ANNUAL FAMILY INCOME	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
Under $2,000	8	32	8	26	15
$2,000–$2,999	24	36	11	32	24
$3,000–$3,999	26	14	22	24	23
$4,000–$4,999	16	6	15	10	14
$5,000 and over	26	12	44	8	24
Total	100	100	100	100	100
Number of families	519	111	209	211	1,050

TABLE 4.—Distribution of total number of persons by age group for four racial groups.

AGE GROUP	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
Under 6 years	16	14	16	17	16
6 to 18 years	23	32	18	30	25
19 to 50 years	49	44	52	43	48
Over 50 years	12	10	14	10	11
Total	100	100	100	100	100
Percent of persons	53	11	15	21	100

TABLE 5.—Distribution of families by family income and occupation of head of family.

OCCUPATION OF HEAD OF FAMILY	ANNUAL FAMILY INCOME GROUP					
	Less than $2,000	$2,000–$2,999	$3,000–$3,999	$4,000–$4,999	$5,000 and over	All
			Percent			
Professional	3	6	16	23	34	18
Commercial	9	22	24	26	33	24
Service (all types)	26	47	40	33	17	33
Retired*	37	9	8	7	9	12
Other	25	16	12	11	7	13
Number of families	150	256	243	144	257	1,050

*Includes unemployed: 21 percent in low income group; 9 percent of total families.

TABLE 6.—Distribution of families by family income and education of head of family.

EDUCATION, HEAD OF FAMILY	ANNUAL FAMILY INCOME GROUP					
	Less than $2,000	$2,000–$2,999	$3,000–$3,999	$4,000–$4,999	$5,000 and over	All
			Percent			
No reply	27	12	7	9	10	12
None	14	5	3	0	2	4
Grammar school	23	18	15	12	9	15
High school	33	61	63	62	47	55
College	3	4	12	17	32	14

TABLE 7.—Distribution by racial groups of replies to the question "Did you buy most of your eggs from the store?"

ANSWERS	HOMEMAKERS WHO MADE A REPLY—1,017				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
Yes	71	73	78	74	73
No	27	23	22	21	24
No reply	2	4	0	5	3
Total	100	100	100	100	100

TABLE 8.—Distribution by racial groups of replies to the question "Are these Oahu, outer island, or mainland eggs?"

SOURCE OF EGGS	HOMEMAKERS WHO MADE A REPLY—1,044				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
Oahu	56	41	53	44	51
Mainland	4	8	10	11	7
All islands	19	19	8	11	15
Oahu and Mainland	14	20	24	20	18
All three sources	7	12	5	14	9
Total	100	100	100	100	100

TABLE 9.—Distribution by racial groups of replies to the question "What do you look for when buying eggs for frying, boiling, etc.?"

REASONS	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
Price only	7	17	6	21	11
Grade and size	5	5	10	5	6
Local eggs	10	5	6	7	8
Combinations	66	60	69	56	64
Other	12	13	9	11	11
Total	100	100	100	100	100

TABLE 10.—Distribution by family income of replies to the question "What do you look for when buying eggs for frying, boiling, etc.?"

REASONS FOR PURCHASES	ANNUAL FAMILY INCOME GROUP			
	Less than $2,000	$2,000 to $4,999	$5,000 and over	All
		Per cent		
Price only	23	10	5	11
Size and grade	4	6	12	7
Oahu source	5	7	11	8
Price and other	47	47	42	46
Other than price	19	29	30	27
No reply	2	1	0	1
Total	100	100	100	100

TABLE 11.—Distribution by size of family of replies to the question "Are these Oahu, outer island, or mainland eggs?"

SOURCE OF EGGS	SIZE OF FAMILY				
	1–3 persons	4 persons	5 and 6 persons	7 or more persons	All
			Percent		
Oahu	51	50	51	51	51
Outer islands	17	15	18	12	15
Mainland	7	7	3	10	7
Mainland and island	24	26	28	27	27
No reply	1	2	0	0	0
Total	100	100	100	100	100

TABLE 12.—Distribution by racial groups of replies to the question "How many island eggs did you use last week?"

NUMBER OF ISLAND EGGS	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
None	5	18	14	22	12
1 to 11	5	9	10	5	6
12 to 23	28	30	35	28	29
24 to 35	31	25	23	23	27
36 to 47	17	9	10	11	14
48 and over	14	9	8	11	12
Total	100	100	100	100	100

TABLE 13.—Distribution by racial groups of replies to the question "How many mainland eggs did you use last week?"

NUMBER OF MAINLAND EGGS	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
None	83	73	72	74	78
1 to 11	3	6	7	4	4
12 to 23	10	11	12	10	10
24 to 35	4	6	5	8	6
36 to 47	0	2	3	1	1
48 and over	0	2	1	3	1
Total	100	100	100	100	100

TABLE 14.—Per capita consumption of mainland and island eggs by racial groups in week prior to interview.

RACIAL GROUP	NUMBER OF PERSONS	ISLAND EGGS	MAINLAND EGGS	ALL EGGS
		Number	*Number*	*Number*
Oriental	2,619	5.5	0.7	6.2
Hawaiian	556	4.1	1.1	5.2
Caucasian	724	5.9	1.4	7.3
Other	1,052	4.3	1.2	5.5
Total	4,951	5.2	0.9	6.1

TABLE 15.—Distribution by family income groups of replies to the question "How many island eggs did you use last week?"

NUMBER OF ISLAND EGGS	ANNUAL FAMILY INCOME		
	Less than $2,000	$2,000 to $4,999	$5,000 and over
		Percent	
None	15	14	5
1 to 11	12	6	5
12 to 23	38	30	22
24 to 35	22	28	28
36 to 47	8	12	20
48 and over	5	10	20
Total	100	100	100
Number of families	127	554	244
Percent of total	85	86	95

TABLE 16.—Distribution by family income groups of replies to the question "How many mainland eggs did you use last week?"

NUMBER OF MAINLAND EGGS	ANNUAL FAMILY INCOME		
	Less than $2,000	$2,000 to $4,999	$5,000 and over
		Percent	
None	83	75	82
1 to 11	6	4	3
12 to 23	6	12	7
24 to 35	3	6	6
36 to 47	2	1	1
48 and over	0	2	1
Total	100	100	100

TABLE 17.—Per capita consumption of island and mainland eggs, by family income groups in week prior to interview.

INCOME GROUP	NUMBER OF PERSONS	ISLAND EGGS	MAINLAND EGGS	ALL EGGS
		Number	*Number*	*Number*
Less than $2,000	573	5.5	0.7	6.2
$2,000 to $4,999	3,052	4.8	1.0	5.8
$5,000 and over	1,326	5.8	0.7	6.5
All persons	4,951	5.2	0.9	6.1

TABLE 18.—Quantity of island eggs used per family in 1 week, by size of family.

NUMBER OF ISLAND EGGS USED	SIZE OF FAMILY			
	1 to 3 persons	4 persons	5 to 6 persons	7 or more persons
		Per cent		
None	15	13	5	15
1 to 11	12	3	5	1
12 to 23	42	29	23	15
24 to 35	24	36	28	23
36 to 47	5	12	24	18
48 and over	2	7	15	28
Total	100	100	100	100
Number of families	299	179	281	166

TABLE 19.—Quantity of mainland eggs used per family in 1 week, by size of family.

NUMBER OF MAINLAND EGGS USED	SIZE OF FAMILY			
	1 to 3 persons	4 persons	5 to 6 persons	7 or more persons
		Percent		
None	77	76	82	74
1 to 11	7	4	3	1
12 to 23	12	12	7	12
24 to 35	4	5	6	8
36 to 47	0	2	0	2
48 and over	0	1	2	3
Total	100	100	100	100
Number of families	82	49	54	50

TABLE 20.—Per capita consumption of island and mainland eggs, by size of family in week prior to interview.

SIZE OF FAMILY	NUMBER OF PERSONS	ISLAND EGGS	MAINLAND EGGS
		Number	*Number*
1 and 2 persons	290	6.8	1.6
3 persons	579	6.4	1.2
4 persons	820	5.7	1.1
5 and 6 persons	1,610	5.3	0.7
7 persons and over	1,652	3.7	0.7
All persons	4,951	5.1	0.9

TABLE 21.—Consumption of all eggs by methods of use, by size of families in week prior to interview.

SIZE OF FAMILY	PER CAPITA CONSUMPTION IN 1 WEEK				
	Breakfast	Egg dishes	Sandwiches	Other	All
			Number of eggs		
1 and 2 persons	5.1	1.5	0.4	1.5	8.5
3 persons	4.8	1.2	0.4	1.2	7.6
4 persons	4.2	1.0	0.5	1.1	6.8
5 and 6 persons	3.9	0.9	0.4	0.8	6.0
7 persons and over	3.0	0.8	0.3	0.4	4.5
All persons	3.8	1.0	0.4	0.8	6.0

TABLE 22.—Replies to the question "How many eggs did you use last week for breakfast, for sandwiches, in main dishes, in desserts, and others?"

KIND OF USE	NUMBER OF HOMEMAKERS WHO LAST WEEK USED (IN DOZENS)				
	4	3	2	1	0.5
Breakfast	40	80	216	434	181
Main dishes	1	4	5	131	249
Sandwiches	0	1	1	20	117
Desserts	1	1	1	31	88
Other	0	0	3	33	150
All uses	42	86	226	649	785

TABLE 23.—Retail price per dozen of island and mainland grade A eggs in Honolulu grocery stores, July–August, 1950.

TIME	RETAIL PRICE			
	Island grade A		Mainland grade A	
	Large	Medium	Large	Medium
	Cents per dozen			
1st week	75	65	62	58
2d and 3d weeks	80	70	64	60
4th week	85	75	70	65
5th and 6th weeks	90	80	74	70
7th to 9th weeks	95	85	75	71

Source: Unpublished data in project 353.2.

TABLE 24.—Distribution by racial groups of replies to the question "How expensive do island eggs get before you refuse to pay the price?"

MAXIMUM PRICE PER DOZEN	RACIAL GROUP				
	Oriental	Hawaiian	Caucasian	Other	All
			Percent		
$1.25 and over	29	23	27	23	26
$1.05 to $1.20	13	10	6	6	10
$1.00	39	30	36	42	38
$0.95 or less	17	32	25	26	23
Not ascertained	2	5	6	3	3
Total	100	100	100	100	100

TABLE 25.—Distribution by family income of replies to the question "How expensive do island eggs get before you refuse to pay the price?"

MAXIMUM PRICE PER DOZEN	ANNUAL FAMILY INCOME		
	Less than $2,000	$2,000 to $4,999	$5,000 and over
		Percent	
$1.25 and over	22	27	31
$1.25 to $1.20	7	10	11
$1.00	40	36	40
$0.95 or less	29	23	16
Not ascertained	2	4	2
Total	100	100	100

TABLE 26.—Distribution by family income of replies to the question "Would you use more eggs: (a) If available at lower prices? (b) If family income were higher?"

WOULD USE MORE EGGS	ANNUAL FAMILY INCOME GROUP			
	Less than $2,000	$2,000 to $4,999	$5,000 and over	All homemakers
		Percent		
(a) At lower prices				
Yes	59	57	45	55
No	39	42	53	44
No reply	2	1	2	1
(b) With higher income				
Yes	17	14	9	13
No	81	85	91	86
No reply	2	1	0	1

TABLE 27.—Distribution by family income of replies to the question "How many more eggs per week would you buy: (a) If you could get them at lower prices? (b) If your income were higher?"

WOULD PURCHASE MORE EGGS PER WEEK	ANNUAL FAMILY INCOME GROUP			
	Less than $2,000	$2,000 to $4,999	$5,000 and over	All homemakers
		Percent		
(a) At lower prices				
Over 2 dozen more	5	3	2	3
2 dozen more	12	11	7	10
1 dozen more	35	36	30	34
½ dozen more	7	8	8	8
No more	41	42	53	45
(b) With higher income				
Over 2 dozen more	2	1	1	2
2 dozen more	5	4	2	3
1 dozen more	9	8	4	7
½ dozen more	1	2	2	2
No more	83	85	91	86

TABLE 28.—Distribution by size of family of replies to the question "Would you use more eggs: (a) If available at lower prices? (b) If family income were higher?"

WOULD USE MORE EGGS	SIZE OF FAMILY			
	1 to 3 persons	4 persons	5 to 6 persons	7 or more persons
		Per cent		
(a) At lower prices				
Yes	51	54	58	57
No	48	44	41	42
No reply	1	2	1	1
(b) With higher income				
Yes	10	15	18	13
No	89	84	81	86
No reply	1	1	1	1

TABLE 29.—Distribution by size of family of replies to the question "How many more eggs per week would you buy: (a) If you could get them at lower prices? (b) If your income were higher?"

WOULD PURCHASE MORE EGGS PER WEEK	SIZE OF FAMILY				
	1 to 3 persons	4 persons	5 to 6 persons	7 or more persons	All homemakers
			Percent		
(a) At lower prices					
Over 2 dozen more	1	2	5	6	4
2 dozen more	7	9	11	16	12
1 dozen more	32	34	38	34	36
½ dozen more	12	10	4	3	6
No more	48	45	42	41	42
(b) With higher income					
Over 2 dozen more	1	..	3	3	2
2 dozen more	1	3	5	4	4
1 dozen more	7	9	8	5	7
½ dozen more	1	4	2	0	2
No more	90	84	82	88	85

TABLE 30.—Premium in price that would be paid for island eggs over mainland eggs at two base prices for mainland eggs, distribution by income group.

PREMIUM FOR ISLAND EGGS	LOW INCOME		HIGH INCOME		ALL REPLIES	
	Base price per dozen		Base price per dozen		Base price per dozen	
	60¢	85¢	60¢	85¢	60¢	85¢
			Per cent			
Per dozen						
20 cents or more	9	2	15	5	16	3
15 to 19 cents	21	14	19	20	23	20
10 to 14 cents	35	44	52	46	42	38
Less than 10 cents	30	24	9	16	14	22
No premium*	5	16	5	13	5	17
Total	100	100	100	100	100	100

*Price that would be paid was same as base price.

TABLE 31.—Premium in price for larger size of eggs, distribution of homemakers by income groups.

PREMIUM FOR LARGER EGGS	LOW INCOME		HIGH INCOME		ALL REPLIES	
	Base price per dozen		Base price per dozen		Base price per dozen	
	60¢	70¢	60¢	70¢	60¢	70¢
			Per cent			
Per dozen						
20 cents or more	0	6	1	3	1	4
15 to 19 cents	7	4	5	5	6	7
10 to 14 cents	40	41	66	62	54	53
Less than 10 cents	46	44	26	25	36	32
No premium*	7	5	2	5	3	4
Total	100	100	100	100	100	100

*Price that would be paid was same as base price.

TABLE 32.—Distribution (a) by racial groups, (b) by income groups, of replies to the question "For most uses do you prefer white or brown eggs?"

PREFERENCE	(A) BY RACIAL GROUPS			
	CAUCASIAN	ORIENTAL	OTHER	ALL
		Percent		
White eggs	9	2	8	4
Brown eggs	32	46	64	47
No choice	59	52	28	49
Total	100	100	100	100
Number of families	209	639	194	1,042

PREFERENCE	(B) BY INCOME GROUPS		
	LESS THAN $2,000	$2,000 TO $4,999	$5,000 AND OVER
		Percent	
White eggs	7	4	4
Brown eggs	39	49	45
No choice	54	47	51
Total	100	100	100
Number of families	146	639	257

TABLE 33.—Distribution by racial groups of replies to the question "Have you ever bought eggs that had something wrong with them?"

REPLY	RACIAL GROUP				ALL REPLIES
	Oriental	Hawaiian	Caucasian	Other	
			Percent		
Yes	22	25	41	33	28
No	78	75	59	67	72

TABLE 34.—Distribution of replies to the question "What was wrong with eggs from different sources?"

DEFECTS NAMED BY HOMEMAKERS	SOURCE OF EGGS		
	Oahu	Outer island	Mainland
		Percent	
Blood spot	16	1	2
Strong odor	3	4	28
Watery whites	3	0	2
Off-color yolk	1	2	8
Miscellaneous	1	4	8
Proportion of defective purchases	24	11	48
Proportion with no defects	76	89	52
Total	100	100	100

APPENDIX B — METHODS AND PROCEDURE

THE SAMPLE

Members of the 1,050 households selected for this study represented a population of about 232,000 consumers in Honolulu. The sample of households was chosen in such a way that each household had an equally probable chance of being included. Hotels and boarding houses were excluded from the sample since their methods of purchase varied from those in private homes. Any households where meals were not served were also excluded.

A list of 35 districts was picked at random from the 285 civilian census enumeration districts in Honolulu. These districts were located in the area from Honolulu Airport to Koko Head. In each district a sample of 30 households was drawn at random for interviews. Alternates were also drawn for enumeration districts and households. The dispersion of population throughout Honolulu was such that no satisfactory basis for stratification of the sample was possible.

THE QUESTIONNAIRE

The questionnaire for the interview was designed to obtain answers on the attitudes, opinions, preferences, and actions of consumers. Answers to questions of this type, "What do you look for when buying eggs for frying or boiling?" measure the relative importance that a respondent places on the reasons for buying eggs.

A second type of question required a more specific answer, for example: "How many island eggs did you use last week?" The quantitative answers provide data on consumer actions which are important to poultrymen, shippers, and distributors regardless of their significance to the respondent.

A third type of question was answered by a choice of terms, for example: "Where do you get most of your eggs?" Data from answers to these questions provide information on the methods and practices of marketing and the extent that standard channels of marketing are used.

The fourth type of question covered personal information on number in family, age, occupation, income, education, and race. Data from these replies, when correlated with quantitative and preference answers, provide a basis for estimation of future demand. Details of "replies to questions" are shown in statistical tables in appendix A.

THE INTERVIEW

Three experienced enumerators, who had been employed in the Census of 1950, were hired to interview homemakers. The enumerators were given the lists of house numbers by streets for various districts with instructions to obtain questionnaires from 30 families in each district. The enumerators made repeated efforts to obtain an interview before an alternate house number was substituted in the sample.

The interviews with homemakers were made over a period of 7 weeks from mid-July through early September, 1950. The length of time required to complete the survey could have been reduced by a more flexible system of using alternative households and by increasing the number of enumerators. The interviews took place from mid-morning until late afternoon with a few in evenings by appointment. Language difficulty was minimized since the three enumerators were of Oriental descent. The active homemaker provided the answers for the majority of questionnaires since many inquiries concerned the use and preparation of eggs.

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